12.3.138 v3
10-8-02

LONGVIEW FIBRE COMPANY

HAZARDOUS PIPELINE INSPECTION AND IDENTIFICATION PROGRAM

MANUAL DISTRIBUTION

1) Seattle Box Plant Manager
2) Yakima Box Plant Manager
3) WJG - Engineering
4) NTS - Engineering

The lists of ticklers are internal and go to Longview books only.

The "master" Hazardous Pipeline Inspection and Identification Program manual is an electronic file stored on the Engineering Clerk's computer. It is a Word 97 document. Changes to this manual are made by the Clerk who will then distribute hard copies of the manual per the distribution list. The electronic file is also converted for online network display. See the Utilities Engineering Section Leader for details regarding manual revisions, distribution, or electronic publication.

DISTRIBUTION LOG

DATE	ACTIVITY DESCRIPTION	BY
12/30/98	10/12/98 Edition issued to above	RLH
03/22/99	03/22/99 Revisions issued to above	RLH
02/03/00	02/03/00 Revisions issued to above	RLH
10/25/01	02/03/00 Revisions issued to NTS	LSC
06/21/02	06/21/02 Revisions No issue	LSC
10/08/02	10/08/02 Revisions issued to above	LSC

LONGVIEW FIBRE COMPANY

HAZARDOUS PIPELINE INSPECTION AND IDENTIFICATION PROGRAM

January 29, 1982

Revised October 8, 2002

Hazardous Pipeline Inspection and Identification Program

Revisions

05-13-82	I-2; added I-2A; I-03; B-1; S-1
10-07-82	A4
02-24-83	Indices, all pages; C-5.1 new; S-9; S-9.1 new; S-10; S-10.1 new; S-10.2 new; removed D-1 (D-1 "Defoamer" is canceled. Per Manufacturer's Material Safety Data Sheets, this material is not considered hazardous by OSHA.)
08-31-83	A-2; Section VI "List of Ticklers" added, Longview only
09-10-84	Table of Contents; List of Applicable Drawings
05-15-85	I-2
10-01-92	General Revision
10-12-98	Corrected typo's section I-1.1 & I-2.1; Revised Section I-3.4; Added Section I-3.7; Updated section I-6 to reflect current text of WAC-296-79-140; Revised Section IV to reflect new pipeline identification procedures; Removed the following unused chemicals: A-5 "Asphalt, Hot & Molten"; C1 "Calcium Hypo Solution"; C3 "Caustic Boilout Solution"; C4 "Chlorine"; C6 "Chlorine Dioxide/Chlorine Gas"; C7 "Chlorine Dioxide Acid"; C8 "Chlorine Dioxide Solution"; H4 "Hypo Filtrate"; H5 "Hypo Stock"; M1 "Milk of Lime"; S1 "Sodium Chlorate R-2 Solution"; S10 "Filtrate, 1st Stage, Bleach Plant"; S11 "Stock, Chlorinated"; S12 "Filtrate, 2nd Stage, Bleach Plant"; S13 "Stock, Caustic"; S14 "Filtrate, 4th Stage, Bleach Plant"; S15 "Stock, Chlorine Dioxide"; S17 "Sulfur (Molten)"; Removed UT inspection requirement on most of the remaining chemicals - left on abrasive or particularly corrosive services; revised drawing size to reflect new LFCo standards; Removed Section VII Hazardous Pipeline Drawing List; Updated tickler list.
03-22-99	Added design & installation guidelines to beginning of section I-3. Renumbered section I-3 paragraphs. Added Auditing guidelines, section I-6.
02-03-00	Modified Chemical N2-"Neutral Sulfite Liquor" for temperatures, pressures. Added entry for Digester Liquor Temperature. Changed WAC number. Added H-4 "Hot Vapors Inspection and Identification Parameters".
06-21-02	Renumbered A2-"300# Air", A3-"Alum" Modified A-4 "Ammonium Hydroxide" for chemical composition, pressure, pipeline and exceptions. Modified N1-"Natural Gas" for exceptions Added new entry S1-"Sodium Hypochlorite" Modified S6-"Steam 800#" for exceptions Removed "Sulfamic Acid"
10-08-02	Added new category F3-"Foul Condensate"

TABLE OF CONTENTS

SECTION I

HAZARDOUS PIPELINE
INSPECTION AND IDENTIFICATION PROGRAM
FORWARD

Revised by: W.J. Gill
October 12,1998

SECTION I

HAZARDOUS PIPELINE INSPECTION AND IDENTIFICATION PROGRAM FORWARD

1.0 Purpose of Program

1.1 In February of 1981, the Washington State Department of Labor and Industries published an additional standard for the pulp and paper industry. This administrative code was written with the help of representatives from both labor and management in response to several recent pipeline failure-related fatalities in the industry. The new code mandates the inspection and identification of hazardous pipelines in hopes of locating and repairing potential failure areas of pipes before an injury-producing failure occurs.

1.2 See the LFCo Safety Office for the complete text of WAC 296-79-140

2.0 Writing of Program

2.1 In response to the new code, Longview Fibre Company formed an ad hoc committee to write and implement an inspection and identification program. Committee members were:

Scott Caldwell
Robert H. Elliott
Bill Gill
Robert Guide
Phil Gurrad
Merritt Ketcham

2.2 The committee reviewed all mill processes and listed those materials that are, by definition,
hazardous.

Material data sheets were prepared listing:

A. Type of hazard
B. Chemical composition
C. Ph
D. Corrosive effect on pipeline
E. Hazard to man
F. Typical applications and exceptions
G. Inspection method to be used
H. Inspection frequency
I. Identifying legend

2.3 These sheets are included as Section V of the program manual. The committee reviewed available literature and wrote detailed inspection procedures for visual pipe inspection and ultrasonic pipe wall thickness inspection. These are section II and III respectively of the program manual.

3.0 Implementation of Program

3.1 All new and revised hazardous material piping systems will be designed and installed in accordance with applicable codes and Longview Fibre Company standards. These include, but are not limited to: ASME B31 codes and the Longview Fibre Company "Piping & Valve Specifications". These requirements apply to LFCo employees and contractors who may design or install hazardous materials piping systems. The Engineering Department will ensure that any such piping (including valves fittings and/or fabrications) meet all requirements of this program. This is intended as a minimum standard to which LFCo will adhere. This shall not substitute for education, experience, or engineering judgment. Rigorous analysis of a design or application may indicate a more conservative approach is needed.

3.2 The Engineering Department shall incorporate the requirements of this program into LFCo Engineering work order procedures and insure that they are utilized for all hazardous material piping installed at Longview Fibre Company. A piping inspection and installation form, "Hazardous Piping Documentation" shall be executed by the Engineering Department to document that the design and installation of the hazardous materials piping system has been accomplished. This form shall be filed in the Engineering Department Hazardous Piping file.

3.3 Each pipeline transporting hazardous material is to be illustrated by a drawing, and given a Longview Fibre Company drawing number. Several pipe systems may be combined on one drawing. Any new drawings should be 11" x 17" size; however, existing drawings may be used were applicable, regardless of size.

Drawings may indicate the approximate inspection points for each pipeline. The number of inspection points will be dependent upon a knowledge of the original material specifications, ambient environment, and the corrosive or abrasive effects of the material handled in the system.

3.4 Copies of the piping drawings are to be used as a field inspection tool. They shall be made available to the field inspector and may be used to trace out the line, locate thickness test points, locate markers, and annotate areas where remedial action is required.

3.5 The Engineering Department shall be assigned to implement the actual inspection. The individual assigned shall be known as the "inspecting engineer". He shall procure the required markers and order their installation. This is best done by waiting for the delivery of the markers, then issuing standard "Engineering Instruction Slip" with a required copy of the appropriate drawings to the general foreman of the maintenance division involved, requiring the markers be installed.

3.5.1 Qualified assistant inspectors working under the general direction of an inspecting engineer may be utilized to inspect piping systems.

3.5.2 Assistant inspectors shall be trained in the proper uses of the thickness tester and visual inspection procedures before the assistant inspects systems. The Longview Fibre Company training department shall keep records of such training.

3.6 The inspector shall visually inspect the pipeline and/or perform the required thickness tests as indicated in the general procedures for visual inspection and ultrasonic thickness testing as described in Section III of this manual. The inspecting engineer will spot check an assistant inspector's work to be sure it is properly performed.

If visual inspections reveal questionable portions of a pipeline, that pipeline shall be reinspected by ultrasonic thickness testing as described in Section III of this manual.

3.7 If remedial action is required, detailed instructions for repair or replacement of same should be written by the inspecting engineer or his assistant. These instructions should be issued to the appropriate mechanical department general foreman with an Engineering Instruction Slip. If the remedial action is an immediate hazard rather than a housekeeping item then a green Safety Engineering Instruction Slip (EIS) should be used. If the required remedial action is of sufficient magnitude, it may be best to write an Engineering Work Order (EWO). See Longview Fibre Company D.I. 15.W030 for a guideline as to the need for an Engineering Work Order.

3.8 A follow-up inspection of the repaired/replaced pipeline is required.

3.9 Since the inception of the piping inspection program in 1982, the use of Ultrasonic thickness testing has been employed as a routine practice. Initial testing confirmed that pipe wall thickness conformed to allowable thickness or better. Subsequent testing however, has not revealed any pipe lines that have required repair or replacement as a result of pipe wall thinning. Some systems tested were 40 years old yet exhibited no metal thickness loss. This NDT method has been ineffective in discovering piping system deterioration not because the method is flawed, but because the piping systems tested are designed and constructed from material that do not thin when exposed to their service conditions. The data collected over the past 15 years has not predicted the deterioration nor the useful remaining life of our piping systems. This test method will be discontinued as a system wide routine practice and/or routine requirement as it does little more than to confirm the like new condition of the pipe. Ultrasonic Thickness testing will continue to be advised at the discretion of the inspector and/or continue to be required for those specific systems where a known abrasive or corrosive condition exists.

4.0 Record Keeping

4.1 The finding of the inspector on his initial pipe inspection and all subsequent inspections shall be noted on the drawing copies or a supplemental document. These documents, including the record of any remedial actions taken, shall be placed in the pipe inspections file cabinet under the appropriate tickler card number. These records will be kept for a minimum of 3 visual inspection frequencies (including the current inspection).

This file cabinet is located in the engineering department. The original drawings in this program will be filed among the other engineering drawings in the engineering drawing vault.

4.2 The standard also requires that all new hazardous piping systems be installed in accordance with the ASME Code for Pressure Piping. Appropriate documentation of this requirement will be retained in the pipe inspection file cabinet as well. These records will be kept for a minimum of 10 years.

5.0 Re-inspection at designated Intervals

5.1 Each pipeline will be re-inspected at a frequency stated on the chemical data sheets in Section V of this manual.

5.2 Re-inspection reminders will be issued by computer in the form of a tickler card. The inspecting engineer doing the initial inspection will arrange with the engineering clerk for the initiation of tickler cards. Tickler cards will be organized by operating division, system type, and/or inspection frequency as deemed practical by the inspecting engineer to facilitate the inspection function.

6.0 Auditing of Program

6.1 The Engineering Department will conduct annual audits of the hazardous material piping program to ensure that inspections and documentation are being done properly. The Chief Engineer will appoint a person familiar with this program for the audit. The auditor will review records of repair, revisions, and inspections of existing hazardous material piping systems, and examine records of new installations. A random physical inspection of hazardous material piping and the tickler card system will be part of the audit.

6.2 A report will be written that details both findings and recommendations for solving any problems or inadequacies discovered during the audit. The report will be given to the Chief Engineer or his designee who will write EIS's or work orders as needed to address the recommendations. If he decides the recommendations of the audit are not reasonable or that there is a better way to address the issue, a report of the action taken and the reasons for the action will be filed with the audit report. This annual audit report will be retained for a minimum of three years.

6.3 The audit criteria will include, but not necessarily be limited to, the following:

The tickler card system:

Have the tickler cards been issued to the proper departments?
Have the tickler cards been updated or corrected before being issued?
Have the tickler cards been returned to the Engineering Department in a timely fashion?
Have the returned tickler cards contained notations for repair work needed or done, resolutions to problems noted in the field, and needed updates of the tickler card for deletions or additions observed in the field?
Have new hazardous materials piping systems been added to the tickler card system?
Has the tickler card list (Section VI) been updated?

Do the safety start-up reviews for systems that contain hazardous material piping verify that:

All required testing of hazardous material piping been done?
All of the proper documentation and record keeping been completed and properly filed?
Have these new hazardous materials requiring piping systems been added to the program?

The hazardous piping material data sheets:

Have chemicals no longer used at the mill been removed from the data sheets?
Have new chemicals used at the mill been added to the data sheets?

SECTION II

GENERAL PROCEDURES
FOR
VISUAL INSPECTION
OF
PROCESS PIPING

Prepared by: P.S. Caldwell and M.H. Ketcham

April 1, 1981

SECTION II

VISUAL INSPECTIONS

1.0 Scope

This procedure will detail the examination method for visual inspection of process piping.

2.0 Method

Trace pipe run visually paying close attention to improper conditions such as:

2.1 Improper support

2.1.1 Poor condition of hangers, mountings, anchors, etc.

2.1.2 Unusual sag or deterioration of pipe due to lack of proper support.

2.2 Damage

2.2.1 Damage to pipe due to physical impact.

2.2.2 Damage to pipe due to external corrosion, abrasion, etc.

2.2.3 Collapse of pipe due to excessive vacuum.

2.3 Improper Identification

2.3.1 Missing labels.

2.3.2 Incorrect labels.

2.3.3 Labels not easily visible.

2.4 Leakage

2.4.1 Seepage that might indicate internal corrosion or fatigue cracking.

2.4.2 Leakage that might cause damage to equipment or personnel.

2.5 Inoperative Steam Traps

2.5.1 Excessive corrosion around traps.

2.5.2 Cold traps indicate malfunction.

2.6 Insulation

2.6.1 Missing or damaged insulation.

2.6.2 Evaluate pipe as candidate for first time insulation.

2.7 Inoperative steam or electrical tracing.

3.0 Record Keeping and Follow-up

Inspection results will be recorded on the appropriate drawing or placed in permanent files. Any corrective action that is required will be ordered with followup inspection scheduled for 30 days after work request is sent.

SECTION III

GENERAL PROCEDURES
FOR
ULTRASONIC THICKNESS TESTING
OF
HAZARDOUS PIPING

Revised by: J. D. Barnett
October 12, 1998

SECTION III

ULTRASONIC THICKNESS TESTING

1.0 Scope

1.1 This procedure will detail the examination methods for ultrasonic thickness measurement of process piping.

2.0 Method

2.1 Surface Preparation - The pipe surface at the point of measurement must be cleaned of heavy scale or other foreign material by either wire brushing or scraping.

2.2 Test Locations - The number of sites to be tested will be dependent upon probability of failure, age, exposure to the environment, and exposure of personnel. The Inspector should choose areas of highest wear such as elbows, reducers, and immediately downstream of pump discharges or control valves. In horizontal runs of pipe, tester should check thickness of both top and bottom line and record the thinner reading. Location of test points should be identified on the original drawing and/or copy.

3.0 Equipment

3.1 Testing will be performed using ultrasonic test equipment with a digital read out

3.2 A cellulose gum solution or equal will be used as a couplant between probe and pipe.

3.3 The device used shall be an ultrasonic thickness meter with the following minimum specifications:

- 4 digit LCD readout
- 0.000 to 9.999 inch measuring range
- ± 0.001 in. display resolution of the entire range.
- Ability to test all materials and acoustic velocities from 1 to 999 in/sec.
- Ambient temperature range from +14°F to 122°F.

4.0 Record Keeping and Follow-up

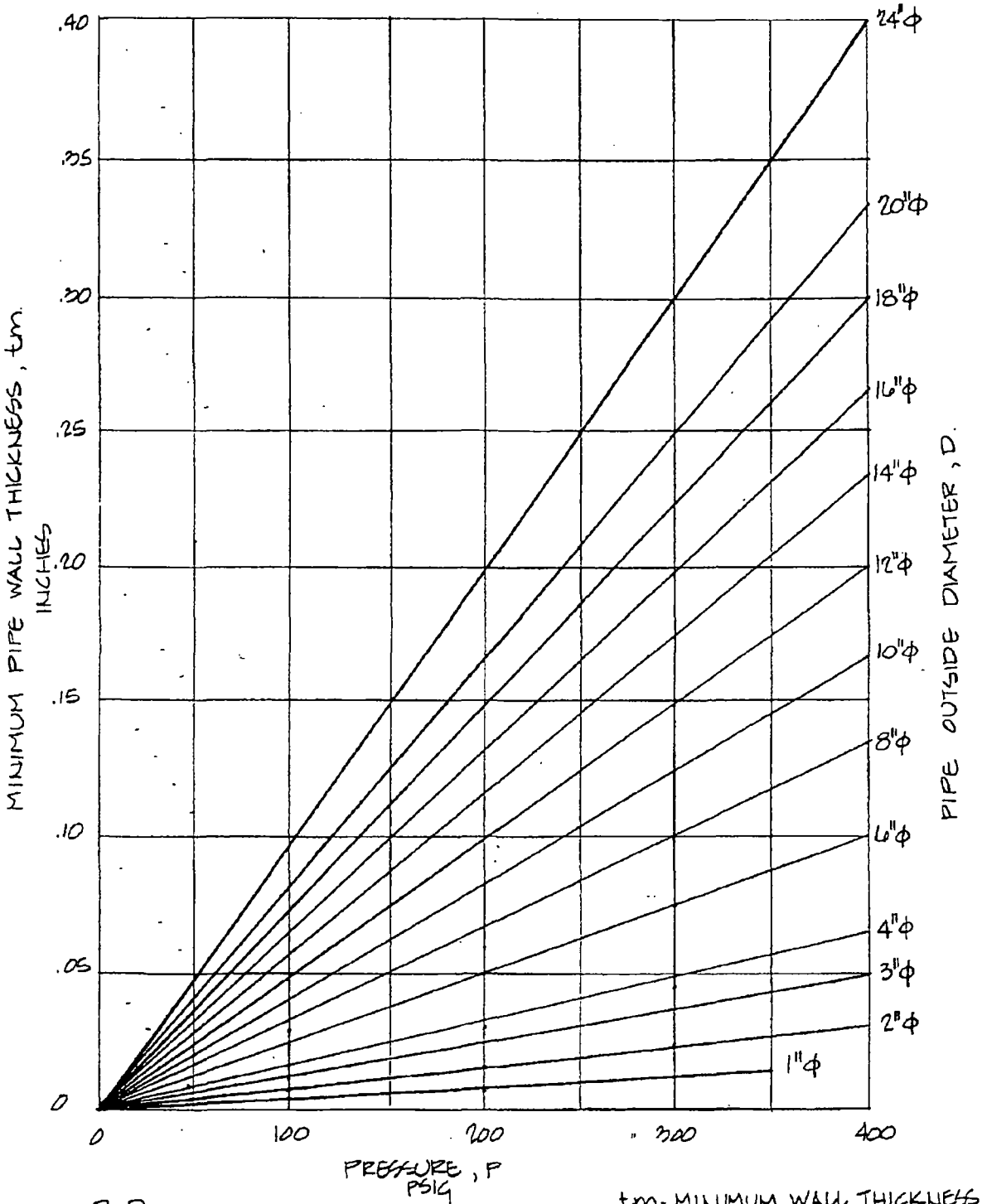
4.1 The reading will be recorded on the appropriate drawing or supplemental sheet. the readings will be accurate to ± .010 inches. Thin areas will be investigated further and corrective action taken, if required.

5.0 Thin Pipe Walls

5.1 When pipe walls are suspected of being thin the inspector should consult Table I which shows the minimum pipe wall thickness that will be tolerated for a given pressure and line size. A pumped system will be considered to operate at pump shut off pressure. If pipe wall thickness is below acceptable limits (per Table I) an EIS or EWO should be written to repair and/or replace.

TABLE 1A

MINIMUM ALLOWABLE THICKNESS FOR CARBON STEEL PIPE



$$tm = \frac{P \times D}{2S + .8D}$$

tm = MINIMUM WALL THICKNESS

P = PRESSURE

D = OUTSIDE PIPE DIA - INCHES

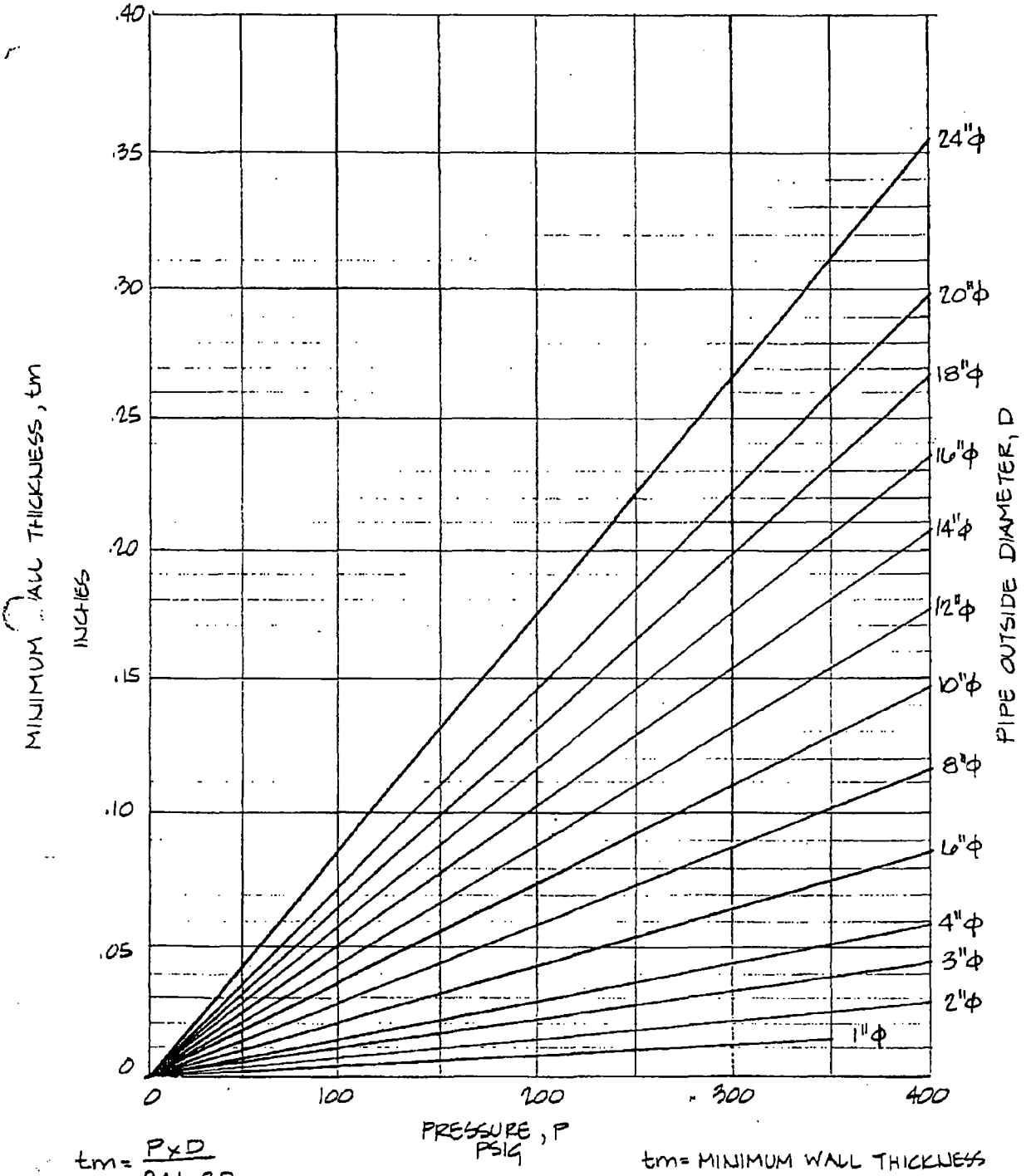
S = ALLOWABLE STRESS PSIG FOR CARBON STEEL (12,000 PSIG)

REFERENCE: PIPING HANDBOOK PG. 3-16
CROCKER & KING FIFTH EDITION

III-2

TABLE 1B

MINIMUM ALLOWABLE THICKNESS FOR STAINLESS STEEL PIPE



$$tm = \frac{P \times D}{2St + .8D}$$

tm = MINIMUM WALL THICKNESS

P = PRESSURE

D = OUTSIDE PIPE DIA. - INCHES

S = ALLOWABLE STRESS PSIG FOR STAINLESS STEEL (13,500 PSIG) OPERATING TEMP - 350° F

REFERENCE : PIPING HANDBOOK PG. 3-16
CROCKER & KING FIFTH EDITION

FABRICATED 304 S.S. PIPE MADE TO SPEC. A240

III - 3

SECTION IV

GENERAL PROCEDURES
FOR
APPLYING AND OBTAINING
PIPELINE IDENTIFICATION LABELS

Revised by: J.D. Barnett

October 12, 1998

SECTION IV

PIPELINE IDENTIFICATION

1.0 Scope

This procedure will detail the philosophy of application and source of supply of pipeline identification labels.

2.0 Method

2.1 Identification labels shall be placed on pipelines containing hazardous materials at suitable intervals to insure positive identification. Labels should be placed at main shut-off valves, on both sides of walls or floors, and at entry points to a tank or other equipment.

2.2 On longer runs of pipe, identification markers should be placed only where an operator can reasonably be expected to see them. The installer should place markers near catwalks and other points of pipe access.

3.0 Identification Markers

3.1 The markers purchased for this pipe identification program shall be a pressure sensitive type that will be affixed longitudinally to the pipe. Each end of the marker shall be restrained by pressure sensitive tape with directional arrows wrapped circumferentially around the pipe. The directional arrows shall point in the direction of pipeline flow.

3.2 For all piping systems covered by this manual, the markers shall consist of black letters on a yellow background. For all piping systems with a piping or insulation diameter greater than or equal to 1", the markers shall be self adhesive tape. For piping systems with a piping diameter less than 1", the marker shall consist of an engraved plastic tag that is to be hung from the piping.

3.3 Reference the following table for the sizes and types of pipe markers:

Piping/Insulation Size	Marker Type	Marker size	Lettering Size
Up to 1"	Plastic Tag	1.5" Wide	.75"
1"-2"	Self Adhesive Tape	1.25" Wide	.75"
2"-3"	Self Adhesive Tape	2.25" Wide	1"
3" & larger	Self Adhesive Tape	4" Wide	2"

3.4 To obtain self adhesive tape labels, contact the LFCo storeroom to have the labels made. Provide the person making the labels with the proper colors, size, and wording for the labels.

3.5 To obtain plastic tag markers, send a written request to the LFCo engraver stating the colors, size, and wording for the tags.

3.6 Tape pipeline markers shall be applied by cleaning the piping or insulation and affixing the tape longitudinally on the pipe. The ends of the tape shall be further affixed to the pipe by wrapping self adhesive tape, with arrows denoting pipeline flow direction, around the blank tape at either ends and completely around the pipe. The total installation shall look like fig. 3.1.

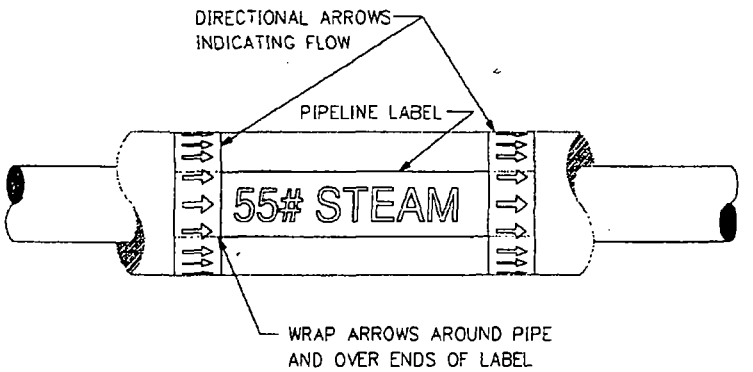


Fig. 3.1

3.7 Plastic tag pipe line markers shall be affixed to the pipe by hanging it by stainless steel wire from horizontal runs of the piping. The total installation shall look like fig. 3.2.

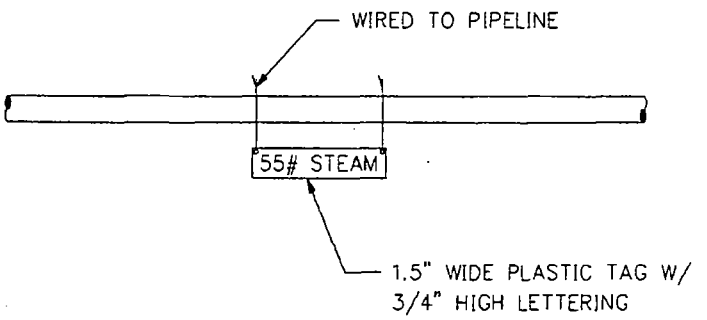


Fig. 3.2

3.8 Wording for pipe line markers shall be per the identifying legend for the material as listed in Section V of this manual.

SECTION V

HAZARDOUS PIPING MATERIAL DATA SHEETS

PIPELINE INSPECTION AND IDENTIFICATION INDEX
(by alphabet)

PIPELINE INSPECTION AND IDENTIFICATION INDEX

(by Alphabet)

N1	Natural Gas	C
N2	Neutral Sulfite Liquor	
N3	Non-Condensible Gas (Dilute)	
N4	Non-Condensible Gas (Strong)	
O1	Oxygen Liquid	
P1	Paper Machine Heat Exchanger Hot water Lines	
P2	Phosphoric Acid	
P3	Propane	
R1	Rejects	
S1	Sodium Hypochlorite (16% and Dilute)	New
S2	Spill Tank Liquor	
S3	Starch, Hot	
S4	Steam, 55#	
S5	Steam 175#	
S6	Steam 800#	C
S7	Steam, Condensate	
S8	Steam, Stripped Condensate	
S9	Stock, Hot	
S10	Sulfuric Acid (Concentrated 93%)	
S11	Sulfuric Acid (Dilute)	
T1	Turpentine	
W1	Washed Soap Solution	
W2	Water, 160°F	
W3	Weak Wash	
W4	Wet Strength	
W5	White Liquor	

ACETYLENE
INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Explosive

Chemical Composition: C_2H_2
(typical)

pH: N/A

Corrosive Effect On Pipeline: Low

Hazard To Man: Suffocating Gas - Explosive

Typical Application:

Pressure	Low
Temperature	Ambient
Pipeline	Schedule 40 Pipe
Exceptions	

Testing Method: Visual

Frequency: Every Five Years

Identifying Legend

ACETYLENE

300# AIR

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Pressure

Chemical Composition: $N_2 + O_2$
(typical)

pH: N/A

Corrosive Effect On Pipeline: None

Hazard To Man: Rupture may cause cut skin or other injury when stream impacts the body.

Typical Application:

Pressure	300 psig
Temperature	130°F
Pipeline	Carbon Steel; Schedule 80; Some Schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every Five Years

Identifying Legend

300# AIR

ALUM

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically Active

Chemical Composition: Aluminum Sulfate (typical)

pH: Acid

Corrosive Effect On Pipeline: Mildly corrosive with 316 ss pipe; inert with hose and lead.

Hazard To Man: Chemical burns

Typical Application:

Pressure	< 80 psig
Temperature	Ambient
Pipeline	Uniroyal #P-1174 Hose 316 Stainless Steel Pipe Some Lead Pipe
Exceptions	

Testing Method: Visual

Frequency: Visual every three years

Identifying Legend

AMMONIUM HYDROXIDE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically toxic

Chemical Composition: NH_3 (19%) H_2O (81%) (typical) C

pH: N/A

Corrosive Effect On Pipeline: Low

Hazard To Man: Suffocating, Toxic Gas

Typical Application:

Pressure	< 250 psi	C
Temperature	Ambient	
Pipeline	Stainless Steel, Carbon Steel	C
Exceptions	1) Secondary Treatment, dilute stream is <100 psi	C
	2) 23 Boiler, gasified streamed is 300°F, <15 psi	C

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

AMMONIUM HYDROXIDE

BIRD CENTRATE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature + chemically active

Chemical Composition: $N_a OH$
(typical)

pH: 13

Corrosive Effect On Pipeline: Low

Hazard To Man: Chemical and thermal burns

Typical Application:

Pressure	50 psig
Temperature	140°F
Pipeline	Schedule 40 Pipe
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

CAUSTIC
BIRD CENTRATE

HEAVY BLACK LIQUOR

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: N_aOH, N_aSO_4
(typical)

pH: 12

Corrosive Effect On Pipeline: Medium

Hazard To Man: Chemical and thermal burns

Typical Application:

Pressure	60 psig
Temperature	200°F
Pipeline	304 Stainless Steel
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

STRONG BLACK LIQUOR

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: N_aOH, N_aSO_4 (typical)

pH: 12

Corrosive Effect On Pipeline: Medium

Hazard To Man: Chemical and thermal burns

Typical Application:

Pressure	60 psig
Temperature	200°F
Pipeline	304 Stainless Steel
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT
STRONG BLACK
LIQUOR

WEAK BLACK LIQUOR

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: N_aOH, N_aSO_4
(typical)

pH: 12

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns

Typical Application:

Pressure	50 psig
Temperature	170°F
Pipeline	Carbon Steel Schedule 40
Exceptions	1. Feed to continuous cookers ≈ 160 psig. 2. Weak liquor after oxidizers ≈ 120°F 3. #6 line filtrate chemically active

Testing Method: Visual

Frequency: Visual every ten years with feed to cookers every five years.

Identifying Legend

HOT
WEAK BLACK LIQUOR

BLOWHEAT ACCUMULATOR WATER

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: N_aOH, N_aS0_4
(typical)

pH: 12

Corrosive Effect On Pipeline: Medium

Hazard To Man: Chemical and thermal burns

Typical Application:

Pressure	60 psig
Temperature	200°F
Pipeline	304 Stainless Steel
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT
ACCUMULATOR WATER

BLOW LINES

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature + chemically active

Chemical Composition: N_aOH, $N_{a2}C0_3$, $N_{a2}S$
(typical)

pH: 13

Corrosive Effect On Pipeline: Low, but high erosion action occurs.

Hazard To Man: Chemical and thermal burns

Typical Application: Digester Piping

Pressure	100 psig
Temperature	250°F
Pipeline	Carbon Steel Schedule 40
Exceptions	1. Continuous cooker blowlines 304 ss schedule 80 with higher temperatures and pressures.

Testing Method: 1. Test holes 1/8" deep by 3/16" diameter. check for weeping.

Frequency:
1. Bend test holes to be checked monthly.
2. Straight sections to be checked yearly by visual methods.

Identifying Legend

HOT
DIGESTER BLOWLINE

BOILER BLOWDOWN

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature - high pressure

Chemical Composition: H_2O
(typical)

pH: 7-9

Corrosive Effect On Pipeline: None other than that normally associated with oxidation of mild steel in intermittent contact with water.

Hazard To Man: Thermal burns

Typical Application:

Pressure	< 800 #
Temperature	700°F
Pipeline	Carbon Steel Schedule 80
Exceptions	

Testing Method: Visual while blowing down.

Frequency: Visual every year.

Identifying Legend

BOILER BLOWDOWN

BOILER CHEMICAL FEED

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active, high pressure

Chemical Composition: N_aOH
(typical)

pH: Alkaline

Corrosive Effect On Pipeline: Low

Hazard To Man: Chemical burns, potential thermal burns if leak is large enough.

Typical Application:

Pressure	800 psi
Temperature	80°F
Pipeline	Carbon Steel Schedule 80
Exceptions	

Testing Method: Visual

Frequency: **Visual every ten years**

Identifying Legend

BOILER CHEMICAL FEED

CAUSTIC
50% AND DILUTE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active

Chemical Composition: N_aOH
(typical)

pH: 14

Corrosive Effect On Pipeline: Low

Hazard To Man: Chemical burns

Typical Application:

Pressure	< 25 psig
Temperature	80°F to 100°F
Pipeline	Carbon Steel Schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

CAUSTIC

BOILOUT SOLUTION

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature and chemically active

Chemical Composition: N_aOH
(typical)

pH: Alkaline

Corrosive Effect On Pipeline: Medium

Hazard To Man: Chemical and thermal burns.

Typical Application:

Pressure	20 psig
Temperature	130°F +
Pipeline	304 stainless steel or carbon steel schedule 40
Exceptions	

Testing Method: Visual

Frequency: Every five years

Identifying Legend

HOT CAUSTIC
BOILOUT SOLUTION

CHEMICAL RECOVERY

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active

Chemical Composition: N_aOH, $N_{a2}C0_3$, C_aC0_3
(typical)

pH: 8 - 12

Corrosive Effect On Pipeline: Low

Hazard To Man: Chemical burns

Typical Application: **Low**

Pressure	50 psi
Temperature	120°F
Pipeline	Carbon Steel Schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

CAUSTIC CHEMICAL SUMP

DEMINERALIZED WATER

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: N_2O
(typical)

pH: 7 - 9

Corrosive Effect On Pipeline: Some because of oxygen content

Hazard To Man: Thermal

Typical Application:

Pressure	50 psi
Temperature	160°F
Pipeline	304 stainless steel
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

DEMINERALIZED WATER

DIESEL OIL

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Combustible

Chemical Composition: Hydro-Carbon (typical)

pH: N/A

Corrosive Effect On Pipeline: None

Hazard To Man: Combustible/Fire.

Typical Application:

Pressure	< 25 psig
Temperature	Ambient
Pipeline	Carbon Steel Schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

DIESEL OIL

EVAPORATOR COMBINED CONDENSATE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature

Chemical Composition: H_2O
(typical)

pH: 8

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns

Typical Application:

Pressure	60 psig
Temperature	180°F
Pipeline	Carbon Steel Schedule 40
Exceptions	

Testing Method: *Visual*

Frequency: Visual every three years

Identifying Legend

HOT
COMBINED
CONDENSATE

FEEDWATER (BOILER)

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature, High Pressure

Chemical Composition: N_2O
(typical)

pH: 7 - 9

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns - Rupture may cut skin or cause other injury due to impact on body

Typical Application:

Pressure	1200 psi
Temperature	350°F
Pipeline	Carbon Steel Schedule 80
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

BOILER FEEDWATER

FILTRATE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature + chemically active

Chemical Composition: N_aOH, Na_2S
(typical)

pH: 8 - 10

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns - some potential for chemical burns in 1st stage

Typical Application: Washer Line Piping

Pressure	40-50 psig
Temperature	140° to 180°F
Pipeline	Carbon Steel Schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT FILTRATE

FOUL CONDENSATE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature, Noxious vapors

Chemical Composition: H_2O, TRS compounds (typical)

pH: N/A

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns

Typical Application:

Pressure	60 psig
Temperature	150-200°F
Pipeline	304 stainless steel
Exceptions	

Testing Method: Visual

Frequency: Visual every five years

Identifying Legend

FOUL CONDENSATE

FUEL OIL

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature and low explosive hazard

Chemical Composition: Hydro-Carbon
(typical)

pH:

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns - can be combustible

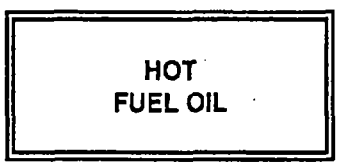
Typical Application:

Pressure	250 psig
Temperature	180°F
Pipeline	Carbon Steel Schedule 40 & some schedule 80
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend



GAS OFF

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature + explosive

Chemical Composition: N_2S, Methyl mercaptans, turpentine (typical)

pH: N/A

Corrosive Effect On Pipeline: Low

Hazard To Man: Suffocating gas - explosive - thermal burns

Typical Application: Digester Piping

Pressure	30 psi
Temperature	240°F
Pipeline	316 s.s. sched. 40, some schedule 80
Exceptions	1. Temperature down to ambient after turpentine system 2. Pressure to 110 psig between Digester and control valve

Testing Method: Visual

Frequency: Every year on Digester annual

Identifying Legend

DIGESTER VENT GAS

GREEN LIQUOR

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active, high pressure

Chemical Composition: $N_{a2}C0_3 + Na_2S0_4 + Na20H + CaC0_3$
(typical)

pH: 14

Corrosive Effect On Pipeline: Low - tends to coat interior of pipe with inert deposit

Hazard To Man: Chemical and thermal burns

Typical Application:

Pressure	< 75 psig
Temperature	205°F
Pipeline	304 stainless steel
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT GREEN LIQUOR

GREEN LIQUOR DREGS

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature and chemically active

Chemical Composition: Na_2S, Na_2SO_4, $CaCo_3$, Na_2CO_3, NaOH (typical)

pH: 14

Corrosive Effect On Pipeline: Low - will scale out in lines

Hazard To Man: Chemical and thermal burns

Typical Application:

Pressure	50 psig
Temperature	160°F
Pipeline	Carbon Steel Schedule 40
Exceptions	1. At dregs dissolving tank green liquor dregs are sewered. Dregs are handled in FRP pipe in this area.

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT
GREEN LIQUOR DREGS

HIGH PRESSURE WATER

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Pressurized

Chemical Composition: N_2O
(typical)

pH: Neutral

Corrosive Effect On Pipeline: None

Hazard To Man: None in itself, is hazardous due only to its amount of stored energy.

Typical Application:

Pressure	500 - 1000 psig
Temperature	Ambient
Pipeline	Sch. 80 Pipe, 2000# Hose
Exceptions	

Testing Method: Visual

Frequency: Visual every five years

Identifying Legend

HIGH PRESSURE WATER

HYDRAULIC OIL

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Pressure

Chemical Composition: Hydro-carbon (typical)

pH: Approximately 7

Corrosive Effect On Pipeline: None - inhibitive

Hazard To Man: Rupture may cause high pressure leak-may cut skin or cause other injury when it impacts the body

Typical Application:

Pressure	1800 - 2000 psig
Temperature	~100°F
Pipeline	Hose and Tubing
Exceptions	

Testing Method: Visual

Frequency: Visual every five years

Identifying Legend

HIGH PRESSURE HYDRAULIC OIL

HYDROGEN

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Flammable

Chemical Composition: N_2
(typical)

pH: N/A

Corrosive Effect On Pipeline: None

Hazard To Man: Suffocating - Explosive

Typical Application:

Pressure	15 psi
Temperature	Ambient
Pipeline	Carbon Steel Schedule 40, Some Tubing
Exceptions	

Testing Method: Visual

Frequency: Visual every three years

Identifying Legend

HYDROGEN

HOT VAPORS

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature/Suffocating gas

Chemical Composition: $H^2$0/Ncg's
(typical)

pH: N/A

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns/Suffocating gas

Typical Application:

Pressure	1 psi
Temperature	215 deg F
Pipeline	304 stainless steel

Testing Method: Visual

Frequency: Visual every five years?

Identifying Legend:

HOT VAPOR

LIME MUD

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active

Chemical Composition: $CaC0_3$, NaOH, Na_2S0_4
(typical)

pH: 14

Corrosive Effect On Pipeline: Chemical burns

Hazard To Man: Chemical burns, potential thermal burns if leak is large enough.

Typical Application:

Pressure	30 psi
Temperature	90°F
Pipeline	Carbon Steel Schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

LUBRICATING OIL

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: Hydro-carbon (typical)

pH: N/A

Corrosive Effect On Pipeline: None

Hazard To Man: Thermal burns

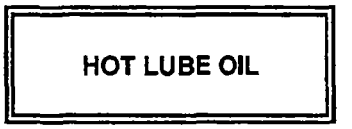
Typical Application:

Pressure	20 - 80 psig
Temperature	130° - 165° F
Pipeline	Carbon Steel Schedule 80
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend



MUD FILTRATE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active

Chemical Composition: NaOH (typical)

pH: 12 - 13

Corrosive Effect On Pipeline: Low

Hazard To Man: Chemical burns

Typical Application:

Pressure	50 psig
Temperature	80°F
Pipeline	Carbon Steel Schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

CAUSTIC MUD FILTRATE

NATURAL GAS

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Explosive

Chemical Composition: Hydro-Carbon
(typical)

pH:

Corrosive Effect On Pipeline: Low

Hazard To Man: Suffocating gas - explosive

Typical Application:

Pressure	< 100 psig
Temperature	Ambient + 20° F
Pipeline	Carbon Steel Schedule 40, some sched 80
Exceptions	Gas Turbine supply is < 350 psig and is sch 40 304L stainless steel above grade C

Testing Method: Visual - Also smell

Frequency: Visual every five years

Identifying Legend

NATURAL GAS

NEUTRAL SULFITE LIQUOR

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature and chemically active

Chemical Composition: $Na_2SO_3 + Na_2CO_3$
(typical)

pH: 7.5 - 9.5

Corrosive Effect On Pipeline: Medium

Hazard To Man: Chemical and thermal burns

Typical Application:

Pressure	50 psig
Temperature	160°F
Pipeline	304 stainless steel
Exceptions	1. After storage tank liquor temperature approx. 100° F 2. Pressure on feed to cooker approx. 150 psig 3. Digester liquor temperature approx. 300+°F

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT
SEMI-CHEM LIQUOR

NON-CONDENSIBLE GAS

DILUTE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Explosive and Poisonous

Chemical Composition: H_2S sulfur gases (typical)

pH: N/A

Corrosive Effect On Pipeline: Low

Hazard To Man: Suffocating gas - low explosive potential

Typical Application:

Pressure	15 psi
Temperature	Ambient
Pipeline	304 stainless steel
Exceptions	

Testing Method: 1. Visual
2. Ultrasonic

Frequency: 1. Visual every five years
2. Ultrasonic every ten years

Identifying Legend

NON-CONDENSIBLE GAS

NON-CONDENSIBLE GAS

STRONG

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Explosive and Poisonous gas

Chemical Composition: H_2S Methyl mercaptans (typical)

pH: N/A

Corrosive Effect On Pipeline: Low

Hazard To Man: Suffocating gas -explosive l

Typical Application:

Pressure	15 psi
Temperature	Ambient
Pipeline	304 ss thinwall
Exceptions	

Testing Method: 1. Visual
2. Ultrasonic

Frequency: 1. Visual every five years
2. Ultrasonic every ten years

Identifying Legend

NON-CONDENSIBLE GAS

OXYGEN, LIQUID

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Low Temperature

Chemical Composition: O_2
(typical)

pH: N/A

Corrosive Effect On Pipeline: None

Hazard To Man: The liquid can cause severe "frost bite" or burn to the skin or other bodily tissues. Gaseous oxygen from the liquid is absorbed readily in clothing and any source of ignition may cause flash burning.

Typical Application:

Pressure	100 psi
Temperature	-290°F
Pipeline	Carbon steel, schedule 40
Exceptions	

Testing Method: Visual

Frequency: Every Five Years

Identifying Legend

LIQUID OXYGEN

PAPER MACHINE HEAT EXCHANGER HOT WATER LINES
INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature

Chemical Composition: $H_2 0$
(typical)

pH: 7 - 9

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal Burns

Typical Application:

Pressure	< 60 psig
Temperature	< 190°
Pipeline	Sch. 40 pipe
Exceptions	

Testing Method: Visual

Frequency: Visual every five years

Identifying Legend

PHOSPHORIC ACID

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active

Chemical Composition: H_3PO_4
(typical)

pH: 2

Corrosive Effect On Pipeline: Low

Hazard To Man: Chemical burns

Typical Application:

Pressure	< 50#
Temperature	Ambient
Pipeline	Polypropylene lined, mild steel, 316ss
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

PHOSPHORIC ACID

PROPANE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Explosive

Chemical Composition: Hydro-Carbon
(typical)

pH: N/A

Corrosive Effect On Pipeline: Low

Hazard To Man: Suffocating gas - explosive

Typical Application:

Pressure	< 50 psig
Temperature	Ambient + 20°F
Pipeline	Carbon steel, sched 40 or tubing
Exceptions	

Testing Method: Visual

Frequency: Visual every five years

Identifying Legend

PROPANE

REJECTS

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: NaOH
(typical)

pH: 11

Corrosive Effect On Pipeline: Low - some erosive action downstream of control valves

Hazard To Man: Thermal burns

Typical Application: Washer Line Piping

Pressure	50 psi
Temperature	160°F
Pipeline	Carbon steel schedule 40
Exceptions	

Testing Method:
1. Visual
2. Check with ultrasound in areas of high wear such as downstream of control valves and pump discharges

Frequency:
1. Visual every ten years
2. Ultrasonic every ten years

Identifying Legend

HOT
PULP REJECTS

SODIUM HYPOCHLORITE

16% AND DILUTE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Corrosive

Chemical Composition: (typical): Na-O-Cl

pH: 11-13

Corrosive Effect on Pipeline: Low

Hazard to Man: Chemical burns

Typical Application:

Pressure <25psig

Temperature 80°F to 100°F

Pipeline Sch. 40 PVC/CPVC

Exceptions

Testing Method: 1. Visual

2. Check with ultrasound in areas of high wear such as downstream of control valves and pump discharges

Frequency: 1. Visual every ten years

2. Ultrasonic every ten years

Identifying Legend

SODIUM HYPOCHLORITE

S-1

SPILL TANK LIQUOR

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: NaOH dilute (typical)

pH: 9

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns

Typical Application:

Pressure	50 psig
Temperature	160°F
Pipeline	Carbon Steel, Schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT
SPILL TANK LIQUOR

HOT STARCH

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Thermally hazardous

Chemical Composition: Organic compounds (typical)

pH: N/A

Corrosive Effect On Pipeline: None

Hazard To Man: Thermal burns

Typical Application:

Pressure	20 psig
Temperature	190°F
Pipeline	Carbon steel schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every five years

Identifying Legend

HOT STARCH

STEAM, 55#

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature

Chemical Composition: H_2O
(typical)

pH: 7 - 9

Corrosive Effect On Pipeline: None - inhibited by additives

Hazard To Man: Thermal burns

Typical Application:

Pressure	55 psig
Temperature	325°F
Pipeline	Carbon steel, schedule 40
Exceptions	

Testing Method: Visual
Ultrasonic

Frequency: Visual every three years
Ultrasonic every eighteen years

Identifying Legend

#55 STEAM

STEAM, 175#

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature

Chemical Composition: H_20
(typical)

pH: 7 - 9

Corrosive Effect On Pipeline: None - inhibited by additives

Hazard To Man: Thermal burns

Typical Application:

Pressure	175 psig
Temperature	450°F
Pipeline	Carbon steel schedule 40 - 80
Exceptions	1. Paper Machine dryer systems - pressures vary 2. Evaporator Vapor Piping - Pressures Vary

Testing Method: Visual
Ultrasonic

Frequency: Visual every three years
Ultrasonic every eighteen years

Identifying Legend

175# STEAM

STEAM, 800#

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature

Chemical Composition: H_2O
(typical)

pH: 7 - 9

Corrosive Effect On Pipeline: None - inhibited by additives

Hazard To Man: Thermal burns

Typical Application:

Pressure	800 psig
Temperature	750°F
Pipeline	Carbon steel schedule 40 - 80 (diameter dependent)
Exceptions	1. Paper Machine Dryer Systems - Pressures Vary 2. Evaporator Vapor Piping - Pressures Vary 3. Gas Turbine Steam Injection - Pressures Vary

C

Testing Method: Visual
Ultrasonic

Frequency: Visual every three years
Ultrasonic every eighteen years

Identifying Legend

800# STEAM

STEAM CONDENSATE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature

Chemical Composition: H_20
(typical)

pH: 7 - 9

Corrosive Effect On Pipeline: Low, some erosion occurs in fittings

Hazard To Man: Thermal burns

Typical Application:

Pressure	55 psig
Temperature	280°F
Pipeline	Carbon steel schedule 40
Exceptions	There are a few high pressure condensate (trap) pipelines in existence

Testing Method: Visual
Ultrasonic

Frequency: Visual every three years
Ultrasonic every eighteen years

Identifying Legend

STEAM CONDENSATE

STEAM STRIPPED CONDENSATE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature

Chemical Composition: Water
(typical)

pH: 8

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns

Typical Application:

Pressure	60 psig
Temperature	180°F - 200°F
Pipeline	Carbon steel schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every three years

Identifying Legend

HOT
STRIPPED
CONDENSATE

HOT STOCK

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High Temperature + chemically active

Chemical Composition: NaOH
(typical)

pH: 12

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns

Typical Application: Washer Line Piping

Pressure	50 psig
Temperature	180°F
Pipeline	Carbon steel schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT STOCK

CONCENTRATED 93%

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active

Chemical Composition: H_2SO_4
(typical)

pH: 1

Corrosive Effect On Pipeline: Low-becomes mildly corrosive when diluted

Hazard To Man: Severe chemical burns

Typical Application:

Pressure	< 25 psig
Temperature	Ambient
Pipeline	Polypropylene lined steel pipe, some Alloy-20, some carbon steel
Exceptions	

Testing Method: Visual - NOTE: Alloy-20 lines being phased out

Frequency: Visual every year

Identifying Legend

SULFURIC ACID

SULFURIC ACID

DILUTE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active

Chemical Composition: H_2SO_4
(typical)

pH: 1

Corrosive Effect On Pipeline: Medium

Hazard To Man: **Severe chemical burns**

Typical Application:

Pressure	< 25 psig
Temperature	Ambient
Pipeline Exceptions	Polypropylene lined steel pipe with some Alloy-20 pipe

Testing Method: Visual - NOTE: Alloy-20 being phased out

Frequency: Every year

Identifying Legend

SULFURIC ACID

TURPENTINE

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Explosive

Chemical Composition: Organic hydro-carbons (typical)

pH: 7 - 9

Corrosive Effect On Pipeline: Low

Hazard To Man: Suffocating gas - highly flammable

Typical Application:

Pressure	30 psig
Temperature	Ambient
Pipeline	Carbon steel schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

TURPENTINE

WASHED SOAP SOLUTION

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active

Chemical Composition: H_A0H
(typical)

pH: 10 - 11

Corrosive Effect On Pipeline: Low

Hazard To Man: Chemical burns

Typical Application: Skimmings from Evaporators

Pressure	20 - 30 psig
Temperature	100° - 120°F
Pipeline	Carbon steel schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

CAUSTIC
WASHED SOAP

160°F WATER

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition:
(typical)

pH: 7

Corrosive Effect On Pipeline: Low

Hazard To Man: Thermal burns

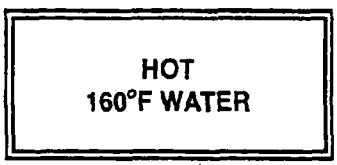
Typical Application:

Pressure	60 psig
Temperature	135° - 165° F
Pipeline	Carbon steel schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend



WEAK WASH

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: High temperature

Chemical Composition: Small quantities of sodium compounds (typical)

pH: 12

Corrosive Effect On Pipeline: Light - tends to coat interior of pipe with inert deposit.

Hazard To Man: Thermal burns

Typical Application:

Pressure	75 psig
Temperature	190° F
Pipeline	Carbon steel schedule 40
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years

Identifying Legend

HOT
WEAK WASH

WET STRENGTH

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically Toxic

Chemical Composition: Amres, Uformite, Parez, Kymene (Resins) (typical)

pH: Acidic

Corrosive Effect On Pipeline: Slightly corrosive to 304 s.s. Pipe and inert w/PVC & Lead

Hazard To Man: If digested internally or sprayed in eyes, can release harmful formaldehyde vapors. Will cause tissue damage.

Typical Application:

Pressure	< 70 psig
Temperature	Ambient
Pipeline	304 S.S. Pipe, PVC Pipe, Lead Pipe
Exceptions	Some M.S. piping does exist - being phased out

Testing Method: Visual

Frequency: Visual every three years

Identifying Legend

WHITE LIQUOR

INSPECTION AND IDENTIFICATION PARAMETERS

Type of Hazard: Chemically active and hot

Chemical Composition: Na_2S + NaOH + Na_2CO_3 + Na_2SO_4 + Ca CO_3 (typical)

pH: 14

Corrosive Effect On Pipeline: Medium

Hazard To Man: Chemical and thermal burns

Typical Application:

Pressure	75 psig
Temperature	205°F
Pipeline	304 stainless steel
Exceptions	

Testing Method: Visual

Frequency: Visual every ten years with feed to cookers every five years

Identifying Legend

LONGVIEW FIBRE COMPANY

5901 EAST MARGINAL WAY SOUTH
P.O. BOX 24867
SEATTLE, WASHINGTON 98124
206-762-7170 FAX 206-767-2442

October 5, 2001

Allpak Container
1100 S.W. 27th St.
Renton, WA 98055

REF: CORRUGATOR SHEETS
PRICES EFFECTIVE NOVEMBER 1, 2001

ECT	CONSTRUCTION	7,500-14,999	15,000-24,999	25,000-49,999	50,000+
ECT 26	28-26-28	$39.33	$37.68	$36.33	$34.44
ECT 32	36-26-36	$39.58	$38.02	$36.74	$34.82
ECT 40	36-26-58	$43.74	$43.00	$41.50	$40.13
ECT 44	58-26-58	$52.45	$51.37	$49.90	$48.41
ECT 44HD	58-26-77*	$74.11	$73.24	$65.62	$61.98
ECT 55	77*-26-77*	$81.04	$74.74	$68.72	$65.38

DOUBLE WALL						100M & OVER
ECT 42	26-26-26-26-36	$67.56	$66.69	$64.26	$63.44	$63.00
ECT 48	36-26-26-26-36	$67.66	$66.88	$64.51	$64.21	$63.58
ECT 51	36-26-36-26-36	$76.68	$73.24	$71.83	$71.49	$70.57
ECT 61HD	58-26-58-26-58	$105.73	$100.49	$89.92	$89.09	$88.66
ECT 71	77*-26-36-26-77*	$137.98	$136.09	$129.01	$125.18	$124.69
ECT 82	77*-26-77*-26-77*	$163.98	$156.61	$151.81	$147.29	$146.86

MISCELLANEOUS MATERIAL UP CHARGES:

Longview Hibrite up to 42#	- add $4.15/MSF
Longview Hibrite up to 69#	- add $6.88/MSF
#1 White 36#	- add $14.00/MSF
26HP CM (1913)	- add $3.70/MSF
33HP CM (1917)	- add $5.85/MSF
Water Resistant Adhesive	- add $1.75/MSF
Michem 1 Side	- add $5.05/MSF
Non-Skid/Corr Grip	- add $2.72/MSF

NOTE: * Call for availability

LONGVIEW FIBRE COMPANY

5901 EAST MARGINAL WAY SOUTH
P.O. BOX 24867
SEATTLE, WASHINGTON 98124
206-762-7170 FAX 206-767-2442

October 5, 2001

E FLUTE SHEETS
PRICE LIST

PRICES EFFECTIVE NOVEMBER 1, 2001

LINER WEIGHT	7,500 MSF - 9,999 MSF	10,000 MSF - 24,999 MSF	25,000 MSF - 49,999 MSF	50,000 MSF - & OVER
26-26	$46.95	$45.20	$42.78	$37.59
33-33	$50.54	$45.93	$43.50	$38.65
42-42	$55.29	$50.68	$45.35	$40.01
36-36	$51.90	$47.43	$42.34	$39.33

ADDITIONAL CHARGES

Longview Hibrite up to 42#	4.15 MSF
#1 White 36#	14.00 MSF
WRA	1.75 MSF
20.5 CM	-.40 MSF

LONGVIEW FIBRE COMPANY

5901 EAST MARGINAL WAY SOUTH
P.O. BOX 24867
SEATTLE, WASHINGTON 98124
206-762-7170 FAX 206-767-2442

October 5, 2001

-3%

Allpak Container
1100 S.W. 27th St.
Renton, WA 98055

REF: CORRUGATOR SHEETS
PRICES EFFECTIVE NOVEMBER 1, 2001

COMPLIANCE CERTIFICATE DOUBLE FACE	CONSTRUCTION	7,500-14,999	15,000-24,999	25,000-49,999	50,000-99,999	100M & OVER
125	26-26-26	$36.57	$36.42	$35.16	$35.11	$33.85
125HD	26-26-33	$39.24	$37.54	$36.28	$36.04	$35.74
150	33-26-33	$39.96	$38.22	$36.86	$36.62	$36.33
200	42-26-42	$40.79	$39.09	$37.73	$37.49	$37.25
200HD	42-26-69	$56.60	$50.73	$48.21	$46.03	$45.98
275	69-26-69	$64.31	$58.59	$57.04	$56.65	$55.44
275HD	69-26-90	$76.39	$75.47	$67.66	$63.92	$63.20
350	90-26-90	$83.52	$77.02	$70.86	$67.42	$67.42
DOUBLE WALL						
N/T	26-26-26-26-26	$67.56	$66.64	$61.06	$60.24	$60.19
200	26-26-26-26-42	$68.58	$67.71	$65.23	$64.41	$63.97
275	42-26-26-26-42	$69.74	$68.92	$66.49	$66.20	$63.24
350	42-26-42-26-42	$80.27	$76.68	$75.22	$74.84	$70.52
350HD	69-26-69-26-69	$110.68	$105.25	$94.14	$93.31	$92.83
500	90-26-42-26-90	$144.48	$142.49	$135.07	$131.05	$130.56
600	90-26-90-26-90	$171.69	$163.98	$158.98	$154.18	$153.75

MISCELLANEOUS MATERIAL UP CHARGES:

Longview Hibrite up to 42#	- add $4.15/MSF
Longview Hibrite up to 69#	- add $6.88/MSF
#1 White 36#	- add $14.00/MSF
26HP CM (1913)	- add $3.70/MSF
33HP CM (1917)	- add $5.85/MSF
Water Resistant Adhesive	- add $1.75/MSF
Michem 1 Side	- add $5.05/MSF
Non-Skid/Corr Grip	- add $2.72/MSF